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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/823,371

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Steven C. Shannon

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05/16/2006

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EXAMINER

ARANCIBIA, MAUREEN GRAMAGLIA

ART UNIT

PAPER NUMBER

1763

DATE MAILED: 05/16/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/823,371

Applicant(s)

SHANNON ET AL.

Examiner

Maureen G. Arancibia

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 March 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 March 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Information Disclosure Statement

1. The listing of references in the specification is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609.04(a) states, "the list may not be incorporated into the specification but must be submitted in a separate paper." Therefore, unless the references have been cited by the examiner on form PTO-892, they have not been considered.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. **Claims 1-20 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.**

Specifically, the recitation in Claims 1, 9, and 10 that the "first match tune space defined by the first sub-circuit can be varied **without substantially affecting** a second match tune space defined by the second sub-circuit" raises the issue of new matter. Paragraph 21 of the Specification, which apparently is the section of the original disclosure relied on for support for the recitation quoted above, states, "a match tune

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space...can be varied by shunt component tuning without the undesirable side-effect on the other frequency's tune space. Consequently, the complimentary frequency tune space **remains unaffected...**" It appears that the recitation "without **substantially affecting**" may raise the issue of new matter, since the original disclosure states that the second match tune space is unaffected. Clarification and/or correction are required.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. **Claims 1, 6-8, 10, and 14-19 are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent 6,642,149 to Suemasa et al.**

In regards to Claims 1 and 10, Suemasa et al. teaches an apparatus for matching the impedance of a pair of RF sources coupled to a single electrode to the impedance of a plasma in a semiconductor substrate processing chamber, comprising: a processing chamber 102 comprising a first electrode 106; a first RF source 122; a second RF source 128; and a dual frequency matching circuit, comprising a first sub-circuit 120 for matching the impedance of a first RF signal generated by first RF source 122 to the impedance of the plasma, and a second sub-circuit 126 for matching the impedance of a second RF signal generated by second RF source 128 to the

impedance of the plasma. The second sub-circuit is connected to the first sub-circuit to form a common output that is coupled to the first electrode 106. (Figure 1)

Suemasa et al. teaches that each of the first and second sub-circuits 120, 126 comprise a variable shunt component (capacitor). (Figure 1) Suemasa et al. does also teach that each of the first and second sub-circuits 120, 126 comprises a variable series component (capacitor). However, the apparatus taught by Suemasa et al. would be inherently structurally capable of being operated with the variable series components being held at a fixed value, and the variable shunt components being varied. Using the apparatus in this way would inherently allow the first match tune space defined by the first sub-circuit to be varied without substantially affecting the second match tune space defined by the second sub-circuit. (The Examiner refers to Paragraphs 20 and 21 of the instant Specification, which disclose that this intended use is performed in the manner just described as capable of being performed by the apparatus taught by Suemasa et al.) In other words, the apparatus taught by Suemasa et al. would be inherently capable of performing this intended use of varying a first match tune space without substantially affecting a second match tune space. This rejection is based on the fact the apparatus structure taught above has the inherent capability of being used in the manner intended by the Applicant. When a rejection is based on inherency, a rejection under 35 U.S.C. 102 or U.S.C. 103 is appropriate. (See *In re Fitzgerald* 205 USPQ 594 or MPEP 2112).

In regards to Claims 6 and 14, the first and second sub-circuits are capable of being fixed in a predetermined configuration prior to performing a process in the chamber. This rejection is based on the fact the apparatus structure taught above has

the inherent capability of being used in the manner intended by the Applicant. When a rejection is based on inherency, a rejection under 35 U.S.C. 102 or U.S.C. 103 is appropriate. (See *In re Fitzgerald* 205 USPQ 594 or MPEP 2112).

In regards to Claims 7 and 15, the apparatus taught by Suemasa et al. is capable of matching the impedance of the first and second RF sources to the impedance of the processing chamber during processing by varying at least one of the variable components of the first and second sub-circuits (Figure 1), or by varying the frequency of at least one of the first and second RF sources, which are variable RF sources (Column 5, Lines 60-66; Column 6, Lines 6-16). This rejection is based on the fact the apparatus structure taught above has the inherent capability of being used in the manner intended by the Applicant. When a rejection is based on inherency, a rejection under 35 U.S.C. 102 or U.S.C. 103 is appropriate. (See *In re Fitzgerald* 205 USPQ 594 or MPEP 2112).

In regards to Claims 8 and 16, Suemasa et al. teaches isolation sub-circuits 118, 124 for preventing power supplied from either of the first and second RF sources 122, 128 from being coupled to the other of the first and second RF sources. (Column 4, Lines 1-3 and 11-13)

In regards to Claims 17-19, Suemasa et al. teaches that the first and second RF sources 122, 128 are both configured to provide an RF signal having a frequency that meets the recited range of about 50 KHz to about 14.2 MHz. Specifically, Suemasa et al. teaches that a first frequency can be from 2 MHz to 10 MHz (Column 2, Lines 34-39; also Claim 3, Column 8, Lines 23-25), which falls within the claimed range, and thus

meets the recited limitation. Suemasa et al. teaches that a second frequency can be 10 MHz and higher (Column 2, Lines 49-50; also Claim 3, Column 8, Lines 23-25), which overlaps with the claimed range, and thus meets the recited limitation.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 2-4, 9, 11-13, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suemasa et al. in view of Japanese Patent Application Publication 06-243992 to Deguchi et al. The following rejection refers to the Figures and English Abstract of this document.

The teachings of Suemasa et al. were discussed above.

In regards to Claims 2, 9, 11, and 20, Suemasa et al. teaches that each of the first and second sub-circuits 120, 126 comprise a variable shunt component (capacitor). (Figure 1) Suemasa et al. further teaches that each of the first and second sub-circuits comprise a set of series components, one fixed (inductor) and one variable (capacitor). (Figure 1)

Suemasa et al. does not expressly teach that each of the first and second sub-circuits comprise a fixed set of series components.

Deguchi et al. teaches that a matching circuit 14 should comprise a fixed set of series components (Figure 1)

It would have been obvious to one of ordinary skill in the art to modify the first and second matching sub-circuits taught by Suemasa et al. to have a fixed set of series components, rather than one fixed and one variable. The motivation for making such a modification to each sub-circuit, as taught by Deguchi et al. (Abstract, Purpose and Constitution), would have been to shorten matching time and to improve responsiveness by substituting variance in the RF source frequency for variance in the series component (capacitor).

In regards to Claims 3 and 12, the match tune space of the first and second RF sources taught by Suemasa et al. would inherently be controllable by the variable shunt components (capacitors). This rejection is based on the fact the apparatus structure taught above has the inherent capability of being used in the manner intended by the Applicant. When a rejection is based on inherency, a rejection under 35 U.S.C. 102 or U.S.C. 103 is appropriate. (See *In re Fitzgerald* 205 USPQ 594 or MPEP 2112).

In regards to Claims 4 and 13, the match tune space of the first and second RF sources taught by Suemasa et al. would inherently be controllable by varying the frequency of the signal generated by one of the first and second RF sources, which are variable RF sources (Column 5, Lines 60-66; Column 6, Lines 6-16). This rejection is based on the fact the apparatus structure taught above has the inherent capability of being used in the manner intended by the Applicant. When a rejection is based on inherency, a rejection under 35 U.S.C. 102 or U.S.C. 103 is appropriate. (See *In re Fitzgerald* 205 USPQ 594 or MPEP 2112).

8. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Suemasa et al. in view of U.S. Patent 6,887,339 to Goodman et al.

The teachings of Suemasa et al. were discussed above.

Suemasa et al. does not expressly disclose the output impedance of the first and second RF sources.

Goodman et al. teaches that RF sources conventionally have a 50 Ohm output impedance. (Column 1, Lines 57-59)

It would have been obvious to one of ordinary skill in the art to use RF sources with a 50 Ohm output impedance in the apparatus taught by Suemasa et al. The motivation for doing so would have been to assemble the apparatus using standard (readily available) components.

Response to Arguments

9. Applicant's arguments filed 3 March 2006 have been fully considered but they are not persuasive. Specifically, the Examiner must disagree with Applicant's assertions that the references fail to show the newly recited limitations in the amended claims. The Examiner's position in regards to the teachings of Suemasa et al. and the secondary references Deguchi et al. and Goodman et al. is clearly set forth in the rejections above.

Conclusion

10. Applicant's amendment necessitated any new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

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§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Maureen G. Arancibia whose telephone number is (571) 272-1219. The examiner can normally be reached on core hours of 10-5, Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on (571) 272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



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